APPENDIX B - MOUNT SPECIFIC DATA
For
Antech 1.2Ku Mount

This appendix describes RC3000 operations unique for the Antech 1.2Ku mount. Differences between this version and the operation described in the "baseline" RC3000 manual are noted on a paragraph by paragraph basis.

1.1 Manual Organization

This appendix is provided as a supplement to the baseline RC3000 manual.

1.2 RC3000 Features – Configuration

A RC3000A version of hardware is required for this mount. The mount model will be designated as T1.

Software will be designated as RC3K-T1-xxx

1.3.1 Controller Description

RESOLVER BOARD. A resolver to digital conversion board has been added to the baseline RC3000A hardware. A schematic of this board is shown in section 4.2.

1.3.2 System Interface Requirements

The T1 interface differs from baseline RC3000 interface requirements as follows:

- No azimuth potentiometer exists, a resolver is used for sensing azimuth position and for performing high resolution (tracking) movements in azimuth.
- A resolver is used for high resolution movements in elevation.
- A polarization stow limit switch is present.
- The elevation brake is controlled via the contact closure normally used for HPA Disable.

1.3.3 Operational Overview

The operation of the T1 version is almost identical to that described in the baseline manual. Differences will be noted in the appropriate paragraphs.

1.3.7 Drive System

Position Sensing and Limits. In addtion to azimuth cw and ccw limit switches, azimuth software limits are implemented.

Also a polarization limit switch is present. Elevation movement below the DOWN limit switch is disabled unless the polarization limit switch is active.

Jam and Runaway Sensing. Jammed and runaway sensing is based on resolver counts.

2.1.4 Inclinometer Orientation

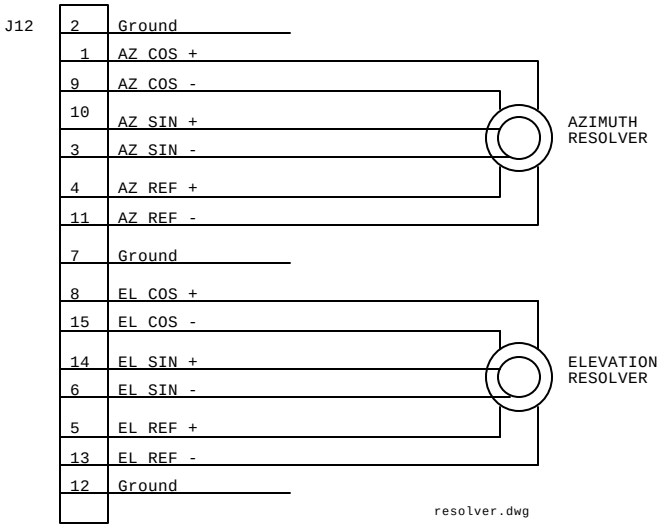
The inclinometer should be rigged with the reflector vertical. With the reflector vertical, the inclinometer should be mounted so that it is 13.0 (35.0 –22.0) degrees from vertical.

2.2.3 Drive Sense.

Azimuth potentiometer inputs are used to implement the interface to the azimuth CW and CCW limit switches.

2.2.12 Waveguide Switch

J12 is used for the resolver interface.



2.3.1 Reset Defaults

The table at the end of the document supplies the default configuration item values for this mount.

2.3.2 Elevation Calibration

Sensor Polarity. The inclinometer should increase in voltage when going up, elevation resolver count should also increase.

Elevation Reference Position. Both the inclinometer and elevation resolver should be calibrated while the reflector is vertical (i.e. the elevation reference position).

With the inclinometer oriented as described in 2.1.4 the elevation reference voltage should be approximately 1.69 volts.

Rotate the elevation resolver until a raw resolver angle of approximately 122.0 degrees in seen in the MAINTENANCE-VOLTS screen. Lock the elevation resolver in place and observe the raw resolver angle. Subtract 22.0 from this observed angle and enter it as the elevation resolver offset (see 3.3.1.2.2)

2.3.3 Azimuth Calibration.

The only position sensor on the azimuth axis is the resolver.

Sensor Polarity. Azimuth resolver "counts" should increase as the mount rotates clockwise. If it does not, the polarity may be changed by setting the azimuth resolver reverse flag.

Azimuth Reference Position. - Position the mount at the azimuth stow position as exactly as possible. Loosen and adjust the azimuth resolver to be as close to 180 degrees (seen at a/d volts screen 3.3.2.1) as possible. The azimuth resolver offset will be 0.0 – "raw resolver angle".

Azimuth Limits. In addition to using CW and CCW limit switch inputs, this version of the RC3000 implements "software" limits. The azimuth CW and CCW pulse limits (3.3.1.3.3) should be set to values that reflect the azimuth resolver count values near the end of azimuth travel. When the RC3000 senses that the azimuth axis has reached these values, it will generate a "software" limit condition even though the actual hardware limit has not been reached. If the user does not want to use the "software limit" feature, set these configuration items to values outside the range of normal azimuth travel.

3.2.1 Manual Mode.

The scroll up key will switch the display between azimuth and elevation angles to resolver "counts".

The azimuth angle is generated as a function of the azimuth resolver feedback. Elevation angle represents true mount elevation based on feedback from the inclinometer.

NOTE: Whenever the elevation axis is below the DOWN limit, the elevation angle shown will be obtained from the elevation resolver instead of the electronic inclinometer.

3.2.2.2 Stow

If stowing of the polarization axis is desired, it may be enabled from the STOW/DEPLOY configuration screen.

3.2.2.8 Settings

Signal Source.

In addition to selecting the signal source for autopeak movements, this will select the signal source for tracking.

3.3.1.2.2 Elevation Calibration.

In addition to the normal inclinometer calibration items, two elevation resolver calibration items are included.

```
REF_V:1.69 OFF:  0.0        CONFIG-ELEV
 DOWN:  0   UP: 90.0   SF:50.00
 LOOK:1    RES: 0.0   REV:0
SET REFERENCE VOLTAGE <0.50 – 3.50>
```

RES: ELEV RESOLVER OFFSET<+/-300.00 DEGREES>

The elev_resolver_offset configuration item defines the offset to be applied to the angle read directly from the elevation resolver for the purpose of displaying elevation angle. Example: If when at the elevation reference (reflector vertical) position the raw elevation resolver angle reads 122.0, a elev_resolver_offset of -100.0 will result in a resolver based elevation angle of 22.0.

REV: ELEV RESOLVER<0-NORMAL 1-REVERSED>

The elev_resolver_reversed configuration item defines whether the polarity of the elevation resolver matches that of the RC3000 resolver circuitry. If the raw elevation resolver angle decreases as the mount moves up, the elev_resolver_reversed item must be described as reversed.

3.3.1.2.3 Azimuth Calibration

In addition to the normal azimuth calibration items, two azimuth resolver calibration items are included. No azimuth reference_voltage item is displayed since no azimuth potentiometer is present.

```
          OFF: 0.0         CONFIG-AZIM
  CCW:180   CW:180
  RES: 0.0 REV:0
SET REFERENCE VOLTAGE <2.00 – 3.00>
```

RES: AZIM RESOLVER OFFSET<+/-300.00 DEGREES>

The azim_resolver_offset configuration item defines the offset to be applied to the angle read directly from the azimuth resolver for the purpose of displaying azimuth angle. Example: If when at the azimuth stow position the raw azimuth resolver angle reads 181.3, a azim_resolver_offset of –181.3 will result in a resolver based azimuth angle of 0.0.

REV: ELEV RESOLVER<0-NORMAL 1-REVERSED>

The elev_resolver_reversed configuration item defines whether the polarity of the elevation resolver matches that of the RC3000 resolver circuitry. If the raw elevation resolver angle decreases as the mount moves up, the elev_resolver_reversed item must be described as reversed.

3.3.1.3.2 Azimuth Pot Drive

Since no potentiometer exists on the azimuth axis, these items actually are used to tune azimuth movements based on angles derived from the resolver feedback.

3.3.1.3.3 Azimuth Pulse Drive

3.3.1.3.6 Elevation Pulse Drive

The items on the Pulse Drive screens are actually used to tune drive movements based on resolver “counts”. The resolver counts are used in the same fashion as pulse counts are used for making precise movements (during tracking, recall) of the mount.

NOTE: the azimuth and elevation pulses_per_radian values are set to 10,431. This is the number of resolver counts per radian.

360 degrees / 65536 total counts = 0.005493164 degrees/count or 182.044 counts/degree.

182.044 counts/degree * 57.29 degrees/radian = 10431 counts/radian

3.3.1.3.4 Azimuth Drive Monitoring

3.3.1.3.7 Elevation Drive Monitoring

The items on the Drive Monitoring screens are actually used to tune drive movements based on resolver “counts”. The resolver counts are used in the same fashion as pulse counts are used for making precise movements of the mount.

3.3.2.1 Analog to Digital Voltages

In addition to the normal voltages displayed this screen also shows “raw resolver” angles and counts.

```
AZ: 1.114   181.30 33004    AD VOLTAGES
EL: 1.143 1 122.30 22264
POL:2.237 0
SIG: 3.756(1) <1>RF <2>SS1 <3>SS2 <4>GND
```

The azimuth and elevation resolver angles and counts displayed are read directly from the resolvers without being biased by offset terms. The displayed values will reflect if the azimuth or elevation resolver polarity has been reversed.

4.2 Schematics

Attached are schematics for the reslover board.

CONFIGURATION ITEM	**T1**							**INSTALL VALUE**
SYSTEM DEFINITION								
Antenna_size_cm	120							
GPS	1							
COMP	1							
MODE	2							
WAVE	0							
AZIMUTH CALIBRATION								
Azim_offset	0.0							
ccw_azim_limit	180							
Cw_azim_limit	180							
Res	0.00							
Rev	0							
ELEVATION CALIBRATION								
Reference Voltage	1.69							
Elev_offset	0.0							
Up_elev_limit	90							
Down_elev_limit	0							
Elevation_Scale_Factor	50.00							
Elevation_look_configuration	1							
Res	0.00							
Rev	0							
POLARIZATION CAL								
Reference Voltage	2.50							
Polarization_Offset	0.0							
CW Polarization Limit	90.0							
CCW Polarization Limit	90.0							
Pol_Scale_Factor	62.50							
Polarization_type	2							
H/V_Reference	1							
Default Horizontal Position	-45.0							
Default Vertical Position	45.0							
Pol_Automove_Enable	1							
SIGNAL PARAMETERS								
Channel 1 Polarity	1							
Channel 1 Threshold	100							
Channel 1 Delay	0.1							
Channel 1 Lock Type	0							
Channel 2 Polarity	1							
Channel 2 Threshold	100							
Channel 2 Delay	0.1							
Channel 2 Lock Type	0							
AUTOPEAK								
Autopeak Enabled	0							
Signal Source	1							
RF Band	1							
Spiral Search AZ Limit	3							
Spiral Search EL Limit	3							

Spiral Signal Threshold	200							
Scan Range Limit	8							
Scan Signal Threshold	200							

CONFIGURATION ITEM	**T1**							**INSTALL VALUE**
AZIMUTH POT DRIVE								
Fast/Slow Threshold	2.5							
Maximum Position Error	0.20							
Coast Threshold	0.1							
Maximum Retry Count	3							
AZIMUTH PULSE DRIVE								
Pulse Scale Factor	10431							
CW Pulse Limit	64000							
CCW Pulse Limit	100							
Fast/Slow Threshold	50							
Maximum Position Error	0							
Coast Threshold	3							
Maximum Retry Count	3							
AZIM DRIVE MONITORING								
Jam Slop	1							
Runaway Slop	200							
Fast Deadband	1000							
Slow Deadband	500							
ELEV POT DRIVE								
Fast/Slow Threshold	3.0							
Maximum Position Error	0.2							
Coast Threshold	0.4							
Maximum Retry Count	3							
ELEV PULSE DRIVE								
Pulse Scale Factor	10431							
UP Pulse Limit	64000							
Down Pulse Limit	100							
Fast/Slow Threshold	50							
Maximum Position Error	0							
Coast Threshold	3							
Maximum Retry Count	3							
ELEV DRIVE MONITORING								
Jam Slop	1							
Runaway Slop	200							
Fast Deadband	1000							
Slow Deadband	500							
POL POT DRIVE								
Fast/Slow Threshold	2.0							
Maximum Position Error	0.5							
Coast Threshold	0.3							
Maximum Retry Count	3							
POL DRIVE MONITORING								
Jam Slop	1							
Runaway Slop	200							
Fast Deadband	1000							
Slow Deadband	500							

CONFIGURATION ITEM	**T1**							**INSTALL VALUE**
TRACK								
Search Enable	0							
Max Track Error	3							
Search Width	4							
Peakup Holdoff Time	120							
Track Signal Source	SS1							
Signal Sample Time	2							
REMOTE CONTROL								
Remote Enabled	1							
Bus Address	50							
Baud Rate	6							
STOW / DEPLOY								
AZ STOW	0.0							
EL STOW	-67.5							
PL STOW	0.0							
AZ DEPLOY	0.0							
EL DEPLOY	22.0							
PL DEPLOY	0.0							
PL ENABLED	1							